SOUTH CAROLINA SCENIC RIVER

South Carolina River News

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Protecting Your Rivers and Streams: Choices for Conservation

by Bill Marshall, SCDNR

You Can Help Protect Rivers and Streams

We can all do more to help protect and improve the rivers and streams in our community by learning more about the problems that affect them and possible solutions to those problems. This special edition of SC River News describes how the important choices we make about managing and developing our property affects our rivers and streams. (The choices affect our lakes too.)

If you own or manage property — a home with a yard, an automobile, pets or livestock, industrial or commercial land, buildings and parking lots, forestland, farmland, or undeveloped land — then these choices may apply to you.

The conservation choices presented on the following pages are arranged by the following themes:

- **Polluted runoff:** We all contribute to pollution. Learn how you contribute and clean up your actions.
- **Stormwater flow:** High volumes of runoff destroy streams and property. Capture runoff from your land and release it slowly.
- **Impervious cover:** Too much pavement is a primary cause of polluted runoff and stormwater flow problems. When building, keep more natural area and pave less.
- **Stream-side buffers:** As natural areas along streams, buffers benefit wildlife, water quality, and you. Protect buffers on all streams.
- **Habitat connections:** Stream buffers best support wildlife when linked to a larger network of habitats. Link your habitats with those of your neighbors.

Ribbons of Life

South Carolina has 30,000 miles of rivers and streams and they flow through all of our cities, towns, and neighborhoods. For many of us, our childhood memories include the adventures of fishing, wading, or swimming in local creeks; and early encounters with wild creatures and nature's beauty occurred while exploring the margins of a stream.

North Fork Edisto River (Photo by SCDNR)

Rich in wildlife. A wide variety of fish and wildlife are found in these special places where the land and water meet. Many animals depend upon these areas for their survival. Fish, salamanders, frogs, crayfish, turtles, snakes, otters, ducks and other creatures may spend all or most of life in the water. While other animals like raccoons, deer, song birds, owls and hawks may come to the areas at the edges of rivers and streams in search of food, water, and shelter.

In many places, the best remnants of intact wildlife habitat may be found along our rivers and streams because these areas are often spared from clearing and development thanks to wet soils, flooding, or steep slopes. This is true in urban or suburban places where much of the land is being used for houses, yards, commercial buildings, parking lots and roads. In many rural places where farm fields may occupy most of the upland areas, the habitats along the rivers and streams, particularly the floodplains, provide large refuges for wildlife.

Even in areas that are wild and undeveloped, stream-side habitats are special places. Where the landscape is completely forested, wildlife biologists consider stream-side habitats to be among the most important areas because they support a great variety and abundance of plants and animals, including many rare and sensitive species.

When seen from an airplane, the wooded lots and stands of trees and shrubs along the banks and floodplains of rivers and streams often appear as corridors — ribbons of natural habitat winding through an otherwise developed or cleared landscape, providing shelter and travel corridors for many species.

Essential to good water quality. The improvement of water quality is another benefit provided by these ribbons of habitat along rivers and streams. Stream-side habitats help to trap and remove pollutants from runoff. Polluted runoff (also know as non-point source pollution) is rainwater that has washed pollutants from land surfaces into nearby rivers, streams, lakes, or ponds.

Continued on page 2

Streams of Life Continued

Reduce Polluted Runoff:

Do Your Actions Help or Harm Water Quality?

After several decades of cleaning up point source pollution from pipe discharges, more than half of the remaining water pollution in the United States now comes from polluted runoff. It is the most common source of water pollution affecting South Carolina's rivers and streams. Besides affecting fish and wildlife, this pollution contaminates our drinking water sources and threatens recreational uses like swimming, fishing, and boating.

Threats. Because of expanding human development, the treats to rivers and streams and stream-side habitats are on the increase. Some portions of South Carolina are building on or paving over the land at a rate five to six times their population growth. Sadly, our typical approach to development involves clearing, grading, filling, paving, and building so as to consume rather than conserve the natural landscape. Unfortunately, most of us don't realize that we are part of the problem. We saturate our lawns with chemicals or let oil keep leaking from our cars with little or no consideration given to the affect of these actions on our rivers, streams, and groundwater.

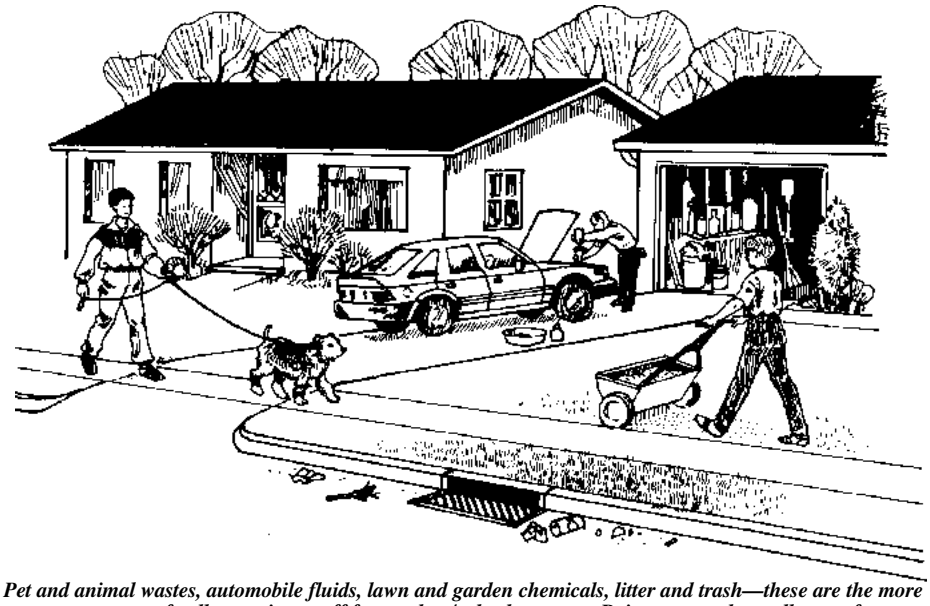
We may think to ourselves, "Clearing that acre of trees down by the creek really won't matter in the grand scheme of things? Can a little extra fertilizer on my lawn and my leaky transmission really hurt anything?"

Make your mark. Our individual choices do make a difference, especially when they are added to similar choices among all our neighbors and fellow citizens. Each of us can choose to make a positive difference for protection of our rivers and streams, so consider the following ways to make yours.

What is polluted runoff? It's the water flowing across streets and parking lots that picks up oil, grease, trash, dirt, animal wastes and other stuff left behind by people, automobiles, and animals. This washwater from pavements typically flows to stormdrains and gets piped into a nearby stream. From construction sites, farm fields, or timberlands the rain may carry a flow of mud and sediment to a stream. From golf courses, agricultural fields, home lawns and gardens, the rain (or irrigation water) may wash fertilizers and pesticides to a stream. Septic tanks that are poorly designed or managed may contribute sewage to runoff. These sources of polluted runoff can be reduced if we all choose to do our part.

Urban or suburban residents can do the following:

- **Properly dispose of pet and animal wastes.** Clean up pet waste from your yard (and from public streets and parks while walking pets). Dispose of wastes in the toilet or trash, or bury them.
- **Do not use storm drains for disposal.** Keep animal wastes, litter, and debris out of street gutters and storm drains. These drains do not typically connect to wastewater treatment plants; rather, they flow directly to streams, rivers, ponds, and lakes.
- **Apply lawn and garden chemicals sparingly or not at all.** Read and follow the directions for applying pesticides and fertilizers. Use only what is really needed. Do not apply them if a heavy rain is expected. Ask your Clemson Extension Service Agents about environmentally-friendly alternatives to lawn and garden chemicals.
- **Properly dispose of oil and household chemicals.** Dispose of used oil, antifreeze, paints, and other household chemicals at recycling centers or service stations. Do not use storm drains or sewers for disposal of these materials. The S.C. Department of Health and Environmental Control (SCDHEC) or your local government can help direct you to places that collect household hazardous wastes.
- **Repair leaking vehicles.** Repair automobile leaks and clean up spilled brake fluid, oil, grease, and antifreeze. Do not hose leaks into the street where they can eventually reach local streams and lakes.
- **Control soil erosion on your property.** Plant ground cover, shrubs, and trees to control erosion and stabilize erosion-prone areas.
- **Seek better laws and enforcement.** Encourage local government officials to develop, improve, and enforce ordinances to control erosion and sediment from construction sites in your community. Report erosion problems to your local government.
- **Inspect septic systems annually, and pump them out regularly.**



Pet and animal wastes, automobile fluids, lawn and garden chemicals, litter and trash—these are the more common sources of pollutants in runoff from urban/suburban areas. Rainwater washes pollutants from pavements and lawns to storm drains that pipe polluted runoff to nearby streams. (Graphic from University of Wisconsin Extension and Wisconsin DNR)

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Forestry landowners can do the following:

- **Follow best management practices for forestry.** Use the guidelines published by the S.C. Forestry Commission in their book entitled *South Carolina's Best Management Practices for Forestry*.

- **Establish stream-side buffers on all streams.** Buffers from 40 to 80 feet wide along all streams are recommended.

- **Report questionable logging practices.** Contact the S.C. Forestry Commission and SCDHEC if you think a logging operation is causing a water quality problem.

Agricultural landowners can do the following:

- **Follow best management practices for agriculture.** Use the guidelinespublished by the S.C. Department of Natural Resources (SCDNR) and the U.S.D.A. Natural Resources Conservation Service in their book entitled *Farming for Clean Water in South Carolina: A Handbook of Conservation Practices*.

- **Establish stream-side buffers or filter strips on all streams.**

- **Control animals and their wastes.** Fence animals away from all streams. Manage animal waste to minimize contamination of surface water and groundwater.

- **Apply pesticides and fertilizers sparingly or not at all. Try organic farming and integrated pest management techniques.**

Everyone can participate in river clean-up efforts:

- **Pick up trash and don't litter.** Huge amounts of trash and litter are washed from streets, parking lots, and ditches into rivers and streams. Much of the trash is deliberately dumped or carelessly discarded. The junk found in streams comes in a wide variety of forms: bottles, cans, bags, buckets, balls, food containers, cigarette butts, automobiles, diapers, tires, 55-gallon drums, newspaper, toys, carpet, crates, etc. You name it and it's probably been pulled from a river.

- **Get involved with the Beach Sweep/ River Sweep and Adopt-a-Landing programs**. You and your group can help clean up the trash. Contact SCDNR and the S.C. Sea Grant Consortium for more information.

Control Stormwater Flow

Capture It and Release It Slowly

When it rains or storms, truck-loads of water can quickly fall onto and flow off a developed site where buildings and parking lots cover the ground. If left uncontrolled, the loads of water can rush into nearby streams and cause damage to downstream properties — damage such as erosion of stream banks and channels, flooding, and sedimentation. Also, as mentioned previously, the loads of water can wash pollutants such as oils, chemicals, animal wastes, and sediment off the site and directly into streams.

Stormwater runoff.
(Photo by Dave Hargett)

Natural controls. Before a site gets paved and developed, natural controls of stormwater are usually in place. On a natural, undeveloped site, one that is fully vegetated with trees, shrubs, and grasses, most of the stormwater soaks into the soil where it will drain slowly though the soil into the nearby creek, into deep groundwater, or it gets taken-up by the trees and shrubs. The soil and vegetation on a natural site serve to store (soak-up) stormwater, filter it, and slowly release it to the stream.

Engineered controls. These days, most new developments are required to replace some of the natural stormwater controls, mentioned above, with engineered controls that delay, capture, store, infiltrate, and sometimes treat stormwater. A standard engineered control is the stormwater basin, or pond, designed to capture (detain or retain) runoff from paved/built-over areas, slowly release it to the stream, or allow it to soak into the ground. In some cases, the stormwater ponds are designed to form a wetlands habitat containing cattails and other water-adapted plants. In a wetlands condition, these ponds can provide the added service of filtering the stormwater before it enters the stream.

Property owners can help control stormwater flow by doing the following:

- **Reduce the area of impervious surfaces, such as pavements.** Allow as small an area as possible to be covered with pavements and buildings, and keep as much area in natural open space as possible. Use pervious surface material where possible; for example, use gravel instead of asphalt for driveways and parking lots. (See Reduce Impervious Cover, below.)

- **Manage the stormwater on your property.** Disperse stormwater into permeable areas such as lawns, grass swales, ditches, or basins to maximize on-site infiltration and minimize runoff from your site. Properties with large areas of impervious surface should establish detention ponds to store runoff, allow pollutants to settle out, and slowly release the water to streams.

Kayaker, Bill Stokes, regularly collects dozens of balls (a prized catch of trash and litter) on outings to the Catawba River near Landsford Canal. The balls are carried by stormwater down from the suburban areas of Charlotte, NC. Stokes repairs the balls and gives them to schools and needy children. (Photo by Layne Bailey, the Charlotte Observer)

Reduce Impervious Cover:

Advocate Better Development Design

Impervious cover includes the roads, parking lots, sidewalks, rooftops, and other impermeable areas of the urban-suburban landscape. Impervious cover can be thought of as the area that is not "green." The problems of stream degradation resulting from polluted runoff and stormwater flow (addressed above) are a direct result of impervious surfaces — the greater the area of imperviousness, the worse the problems become. Unfortunately, impervious cover is on the increase.

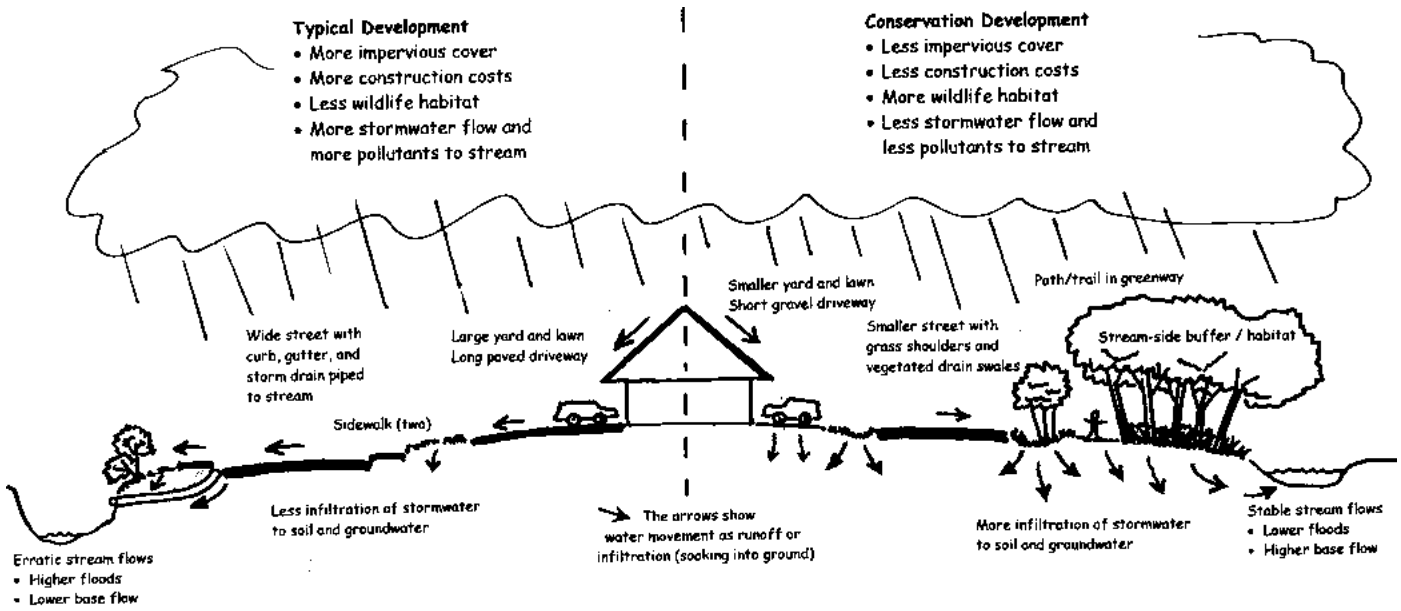
Pavement rules. Our approach to development in recent decades has resulted in increasingly more built-up and paved-over surface area per person. The rules and regulations on development often require wide streets, long driveways, expansive parking lots, and large-lot subdivisions that create needless impervious cover and crowd out natural areas and open spaces. We need to change the development rules and reverse this trend. We need to develop in ways that are more compact and conserve more natural space.

Greener and cleaner alternatives. Site planners have an excellent opportunity to reduce stormwater flow and polluted runoff to streams by changing the way they layout new developments. By employing open-space design techniques they can collectively reduce the amount of impervious cover, increase the amount of natural land conserved, and improve the performance of stormwater treatment systems. Open space designs concentrate development on one portion of a site in order to conserve open space elsewhere on site. This alternative design approach, sometimes referred to as "conservation design" is accomplished by allowing flexibility with the lot sizes, frontages, road sections, and other subdivision geometry.

Open space / conservation design techniques. By incorporating better design techniques that reduce impervious cover and increase natural open space, new developments will reduce impacts to streams from stormwater flow and polluted runoff. Residential design techniques are described in the drawing, shown below.

Similar techniques can be applied to commercial development.

Aerial view of typical development shows the heavy application of roads and loss of natural areas.



Conservation design techniques for residential development: Use narrower, shorter streets and rights-of-way. Apply smaller lots and setbacks and narrow frontages to preserve significant open space. Reduce the amount of site area devoted to residential lawns and more to natural open space. Spread stormwater runoff over pervious surfaces. Use grassy shoulders and swales rather than curbs and gutters. Protect stream-side buffers. (Graphic by Bill Marshall)

Create Stream-side Buffers:

Buffers Benefit Wildlife, Water Quality, and You

Many property owners with an interest in supporting wildlife, protecting water quality, slowing stormwater, and/or stabilizing stream banks will purposefully leave strips of land along rivers, streams, or drainage ways in a natural vegetated condition. These strips of undeveloped, forested and shrubby land are often called stream-side buffers (they may also be called riparian buffers, stream-side management zones, or filter strips). The term "buffer" refers to something that protects, shields, or reduces impacts.

We need more property owners and developers to consider keeping and restoring stream-side buffers because they serve us all in several ways. Consider the following benefits of stream-side buffers.

Benefits of stream-side buffers:

- **Provide wildlife habitat.** Trees and shrubs in buffers provide food, shelter, and structure that supports a variety of insects, animals and plants, both in the stream and on land.

- **Improve water quality.** Buffers trap and remove sediment, nutrients, and other pollutants that get washed from upland areas to the stream. Trees in the buffer shade the stream providing cooler water temperatures that benefit aquatic life. Note this: Some of the best water quality benefits come from buffering the smallest streams, those you can jump across.

- **Reduce streambank erosion.** The tree roots in buffers will consolidate and hold the soils of the bank and floodplain, reducing the potential for severe bank erosion.

- **Provide effective flood control.** Buffers that include floodplains store and slow-down flood waters and thereby reduce damage to downstream properties. Expensive flood controls, such as levees, are not necessary when buffers include the 100-year floodplain.

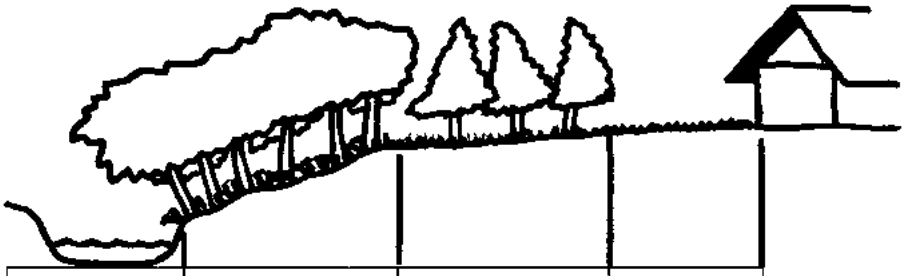
- **Increase property values.** Increasing numbers of homebuyers are attracted to the amenities of undeveloped, natural areas (such as buffers) in their communities.

- **Reduce maintenance costs.** Some studies have shown that corporate landowners can save many hundreds of dollars per acre in annual mowing and maintenance costs when open lands are managed as vegetated buffers rather than turf grasses.

Let your stream-side land go natural. Conserving or restoring stream-side buffers will support more wildlife and help protect streams from polluted runoff and rushing stromwater that flows from developed areas. (Graphic from University of Wisconsin Extension and Wisconsin DNR)

- **Decrease public investment needs.** By reducing floods, erosion, and polluted runoff, buffers can minimize public costs of stormwater management systems and water quality restoration projects.

- **Enhance recreation.** Stream buffers can be designed to provide recreational opportunities for communities by connecting open spaces, creating linear parks, and providing trails to serve walkers, runners, and bikers.



Characteristics	Stream-side Zone	Middle Zone	Outer Zone
Width	25 feet plus wetlands and critical habitats	25 to 50 feet depending on stream order, slope, and 100 year flood plain	25 foot setback to structures and pavements
Vegetation	Undisturbed forest, reforest if grass	Managed forest, with some timber harvest	Forest or turf
Uses	Very limited: flood control, footpaths, utility right of ways	Limited: some recreational use, selected tree removal	Not limited: lawns, gardens

Stream-side buffer concept depicting three zones with different characteristics and uses designed to protect water quality and wildlife habitats. (Graphic adapted from The Practice of Watershed Protection. 2000. Center for Watershed Protection)

The size, or width, of a stream-side buffer will vary depending on the interests of the landowner and the size of the stream. Suggestions for stream-side buffer widths can range from 35 to 300 feet; the larger the buffer is, the greater the natural benefits.

What size buffer to consider:

- **40-80 feet: water quality buffer.** For water quality protection, a minimum buffer width of 40 to 80 feet (dependent on slope) is recommended on both sides of the stream. Steeper slopes need larger buffers.

- **100-300 feet: wildlife habitat buffer.** For conserving and enhancing wildlife habitat, and to better enhance water quality, it is recommended that a buffer measuring 100 to 300 feet be established. The wider the buffer, the greater the benefits for wildlife. Ideally, the buffer should include the natural floodplain and adjacent uplands.

Make Habitat Connections:

Stream Buffers are Key to Linking Habitats for Wildlife

An important way to improve wildlife habitat is to expand the available habitat area. In developing communities, where habitat (natural undeveloped land area) is usually shrinking, one very important approach to optimize the available habitat area is to enhance the connections (or linkages) among habitats and avoid further fragmentation (or isolation) of habitats. Maintaining or restoring habitat connections provides for a larger contiguous area of habitat that can better support some sensitive species and provide travel corridors needed for wildlife movement.

Streams promote habitat connections. Because streams branch out into all communities they can present opportunities to keep or improve habitat connections. Isolated wood lots, stands of trees, and other undeveloped areas can be connected (linked together) with stream corridors and become part of a larger "network" of habitats.

Habitat connections can be made on individual pieces of property or, better yet, among many neighboring properties or, best of all, throughout an entire community, county, or watershed.

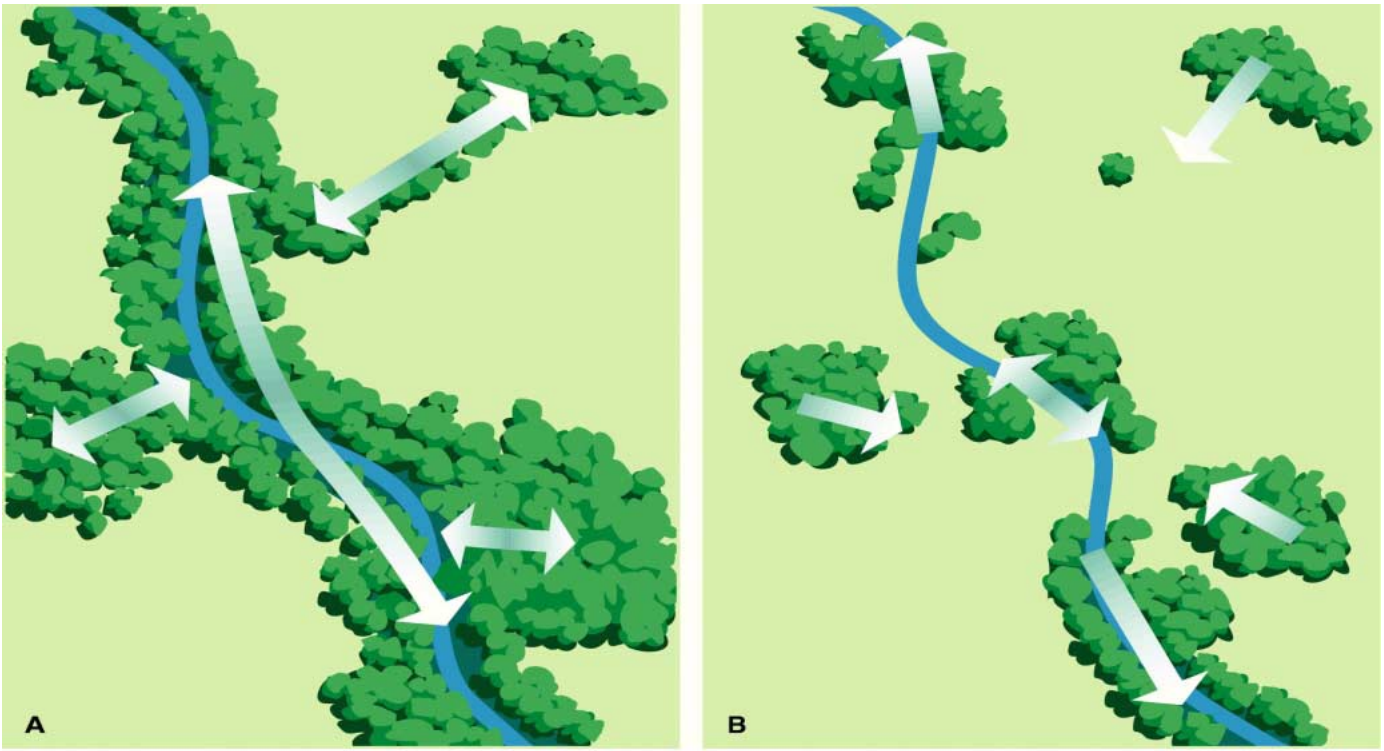
Developers and landowners can improve habitat connections:

- **Design sites to include more habitat area.** Developers can design their projects to keep more habitat area on their sites and keep habitat connections both within their site and with neighboring properties, particularly where a stream or drainage corridor is shared. Buyers of real-estate can seek out developments where the master plan and design conserves or creates more habitat, habitat connections, and buffers on streams.

- **Allow more area to go wild.** Landowners may be able to link upland wooded lots and undeveloped or natural areas with a neighboring stream corridor by letting more areas grow wild; for example, not cutting or mowing where a wildlife corridor (a habitat linkage) can be established.

- **Commit to keeping and expanding buffers along streams.** Establish buffers along streams and drainage ways, plant more trees and shrubs, and encourage neighboring landowners to do the same. Together, a community of landowners can improve habitat connections by establishing a continuous, unbroken buffer running the length of a stream, and throughout a watershed.

- **Use conservation easements to make land protection permanent (with tax benefits).** Landowners truly interested in protecting the natural and cultural value of their land should learn about the tax advantages of conservation easements. These flexible deed restrictions can shelter the land (and family) from estate taxes and property taxes, and allow continued use of the land within specified limitations. Land trust organizations have experts that help interested landowners find ways to protect their land in the face of development pressure. Conservation easements can improve the financial feasibility of open space / conservation design plans for developments (described above). They can also give permanent protection to stream buffers and other natural areas.

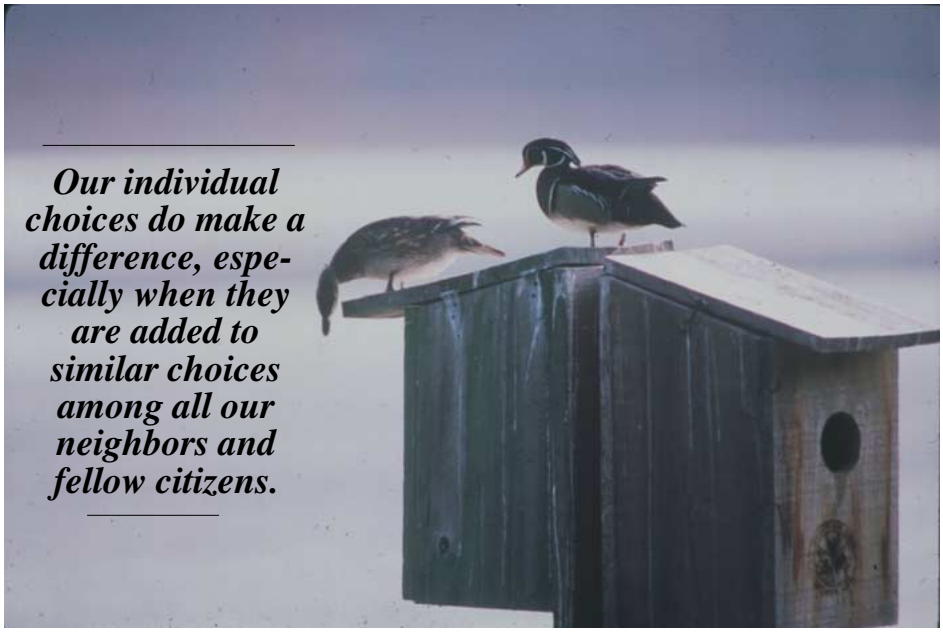


Habitat connections in stream corridors: (A) good connections (B) poor connections. Stream corridors provide opportunity for landowners to improve wildlife habitat quality (and protect water quality) by conserving continuous stream-side buffers (as depicted in A) and linking buffers outward to nearby upland habitats. (Graphic from Stream Corridor Restoration: Principles, Processes, and Practices. 1998. Produced by 15 federal agencies of the US)

The Choice is Up to You

The golden rule calls us to consider how our actions will affect other people. How will our dumping, spraying, clearing, building, or paving impact folks downstream, downwind, or within view of us? And what about those downstream from us in time—our stewardship of the earth directly affects the generations that will follow us.

So consider your actions and make good choices. Use this information and other sources and begin making a positive difference in the protection of stream habitats and water quality in your community today.



Our individual choices do make a difference, especially when they are added to similar choices among all our neighbors and fellow citizens.

Contacts and Information Sources

Center for Watershed Protection: Ellicott City, MD; (410) 461-8323. Publication: *The Practice of Watershed Protection*. Website: The Stormwater Managers Resource Center: www.stormwatercenter.net

Clemson University Cooperative Extension Service: Offices located in most counties; check local listings. Publication: *South Carolina Home-A-Syst: Home Assessment System for Water Quality Protection.* (Coastal residents, ask for *Coast-A-Syst*.) Website: Water Quality Home Page: www.clemson.edu/waterquality or www.clemson.edu/public

Land Trusts: About 20 land-trust organizations exist in South Carolina. Examples include: Congaree LT, Columbia (803) 988-000; Lowcountry Open LT, Charleston (843) 577-6510; Upstate Forever, Greenville (864) 250-0500. The Land Trust Alliance, a national organization, provides information on land trusts and conservation easements at its website: www.lta.org

S.C. Department of Health and Environmental Control: Columbia, SC; (803) 898-4300. Publications: *(1)Turning the Tide: A Citizen's Guide to Reducing Nonpoint Source Pollution.* (2) *Final Report of the Statewide Task Force on Riparian Forest Buffers.* Website: www.scdhec.net/water

SCDHEC – Office of Ocean and Coastal Resource Management: Charleston, SC; (843) 744-5838. Publications: (1) *Vegetated Riparian Buffers and Buffer Ordinances*. (2) *Wetland Restoration: An Alternative Way to Treat Nonpoint Source Pollution.* Website: www.scdhec.net/ocrm

S.C. Department of Natural Resources: Land, Water, and Conservation Division, Columbia, SC; (803) 734-9100. Publication: *Farming for Clean Water in South Carolina: A Handbook of Conservation Practices*. Website: www.dnr.state.sc.us — see "Conservation" or "Environment".

S.C. Forestry Commission: Columbia, SC; (803) 896-8800. Publication: *South Carolina's Best Management Practices for Forestry*. Website: www.state.sc.us/forest — see "Environmental Management".

S.C. Sea Grant Consortium: Charleston, SC; (843) 727-2078. Publication: *South Carolina Coast-A-Syst: Environmental Risk Assessment System for Protecting Coastal Water Quality*. Website: www.scseagrant.org

S.C. Wildlife Federation: Columbia, SC; (803) 256-0670. Website: www.scwf.org — see "Backyard Habitat" program.

Stream Corridor Restoration: Principles, Processes, and Practices: Website: www.usda.gov/stream_restoration

U.S.D.A. Natural Resource Conservation Service: Contact your local Conservation District office located in most counties. Website: www.nrcs.usda.gov — see "Backyard Conservation" and "Conservation Buffers."

NEMO: Nonpoint Education for Municipal Officials Project: Website: nemo.uconn.edu

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